

INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU03/01314

A. CLASSIFICATION OF SUBJECT MATTER		
Int. Cl. ⁷ : C12N 15/11		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
Minimum documentation searched (classification system followed by classification symbols) SEE BELOW		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched SEE BELOW		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) WPIDS, CA, MEDLINE:molecular breeding, dna or gene shuffling, in vitro evolution, enzyme, hydrolase, cellulase, glucosidase, galactosidase, bacteria, microorganism, fluorescence, colour, indoxyl, sugar		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	Cohen N et al (2001) TRENDS in Biochemistry 19(12), 507-510 "In vitro enzyme evolution: the screening challenge of isolating the one in a million" See in particular table 1	1-27
X	WO 02 18629 A1 (MACQUARIE RESEARCH LTD) 7 March 2002 See examples in particular	1-9, 11-14, 16-19, 21-25, 27
X	WO 99 20768 A1 (THE PROCTER & GAMBLE COMPANY) 29 April 1999 See in particular claims 1 and 2, and pages 5-14	1-14, 21-25, 27
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C <input checked="" type="checkbox"/> See patent family annex		
* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
Date of the actual completion of the international search 10 November 2003		Date of mailing of the international search report 17 NOV 2003
Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaustalia.gov.au Facsimile No. (02) 6285 3929		Authorized officer TERRY MOORE Telephone No : (02) 6283 2632

INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU03/01314

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 323 030 B (STEMMER et al) 27 November 2001 See in particular claims and examples	1-14, 16-25, 27
X	Coco WM et al (2001) Nature Biotechnology 19, 354-9 "DNA shuffling method for generating highly recombined genes and evolved enzymes" See whole document	1-14, 20-25, 27
X	Joo H et al (1999) Nature 399, 670-3 "Laboratory evolution of peroxide-mediated cytochrome P450 hydroxylation" See whole document	1-9, 11-14, 21-25, 27
X	Joo H et al (1999) Chemistry and Biology 6, 699-706 "A high-throughput digital imaging screen for the discovery and directed evolution of oxygenases" See whole document, in particular discussion	1-15, 20-27
X	Shibuya H et al (2000) Biochem J. 349, 651-6 "Enhancement of the thermostability and hydrolytic activity of xylanase by random gene shuffling" See whole document	1-14, 16-19, 21-23, 27
X	Gibbs MD et al (2001) Gene 271, 13-20 "Degenerate oligonucleotide gene shuffling (DOGS): a method of enhancing the frequency of recombination with family shuffling" See whole document	1-9, 11-14, 16-19, 21-25, 27
X	Zhang J-H et al (1997) Proc Natl Acad Sci USA 94, 4504-9 "Directed evolution of a fucosidase from a galactosidase by DNA shuffling and screening" See whole document	1-14, 16-25, 27

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/AU03/01314

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Member					
WO	9920768	BR	9813865	CA	2307324	EP	1023448
US	6323030	AU	10245/02	AU	10873/97	AU	23377/97
		AU	25426/97	AU	29714/95	AU	45037/97
		AU	45971/97	AU	57292/98	AU	58509/96
		CA	2182393	CA	2239099	CA	2247930
		CN	1145641	EP	0752008	EP	0824542
		EP	0876509	EP	0906418	EP	0911396
		EP	0932670	EP	0934999	EP	0946755
		EP	0963434	EP	0964922	EP	1094108
		EP	1103606	EP	1138763	EP	1149904
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		JP	2000308490	JP	2001057893	JP	2001197895
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		US	5811238	US	5830721	US	5834252
		US	5837458	US	5928905	US	6096548
		US	6117679	US	6132970	US	6165793
		US	6180406	US	6277638	US	6287861
		US	6291242	US	6297053	US	6303344
		US	6309883	US	6319713	US	6335160
		US	6344356	US	6355484	US	6358742
		US	6365408	US	6372497	US	6387702
		US	6391640	US	6395547	US	6406855
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		US	6455253	US	6482647	US	6505916
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		US	6586182	US	6602986	US	2001046707
		US	2001049125	US	2002025517	US	2002051976
		US	2002068363	US	2003027156	US	2003082611
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		WO	9522625	WO	9633207	WO	9720078
		WO	9735957	WO	9735966	WO	9813485

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/AU03/01314

WO 9813487

WO 9827230

END OF ANNEX